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Probabilistic Approaches to Machine Learning

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Abstract

Probabilistic methods provide a framework for representing and manipulating uncertainty, for learning from noisy data, and for making decisions that maximize expected utility - components which are important to both AI and Machine Learning. However, although probabilistic methods have become more popular in recent years, there remains a good degree of skepticism with respect to taking a fully Bayesian approach. This tutorial aims at introducing fundamental topics in Bayesian statistics as they apply to machine learning and AI, and addressing some misconceptions about Bayesian approaches. The tutorial will also attempt to present a balanced view of the limitations of Bayesian machine learning approaches. Finally the tutorial will delve into recent research directions in Bayesian machine learning, including approximation algorithms and nonparametrics.

Syllabus: _Probabilistic approaches, Bayesian machine learning and AI, approximation and nonparametrics algorithms._